

REMARKS

Applicant has carefully studied the outstanding Office Action. The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Applicants' representative wishes to thank the Examiner for the opportunity to discuss the invention during an interview conducted April 24, 2004. During the interview the Examiner proposed certain amendments which he indicated would distinguish the claims over the art of record. The proposals are generally acceptable except for the feature of simultaneously transferring the high resolution image data and the low resolution image data to the remote terminal. While it may be possible and even advantageous to do so, it is not necessary to transfer the images together. However, the claims have been amended to indicate that the high resolution and low resolution images may be transferred to the remote terminal if desired.

Applicants note that the claim states that the high resolution image and the low resolution image are stored in a data store, but the transfer of the images need not be simultaneous. Such a limitation would be overly restrictive of the invention.

The method recited in amended claim 1 involves acquiring high power/resolution image data by scanning or imaging the complete specimen using a high power objective lens, to obtain a high resolution, magnified image of the complete specimen in a single scan. Thereafter, a low resolution copy of the high resolution image data is obtained by digitally processing the high resolution image data. Both the high resolution and low resolution image data is stored in a database. Thus, all the necessary image data is acquired for the complete specimen, and this image data is employed to produce the low resolution image data for the navigation map. In other words, it is only necessary to scan the specimen once to obtain all the information necessary to conduct telemicroscopy. The processing step to produce the low resolution image data uses the already acquired data. The prior art must acquire the information in more than one scan, one at high magnification and once at low magnification.

The method also comprises allowing access to the image data in a telemicroscopy process. In response to a request by a user of a terminal, which may be remote from the local

system where the data is acquired and stored, the low resolution image data will be transferred from the database to the terminal for display as a "navigation map" as described in the application. The user can select an area of the complete specimen, using the navigation map, for viewing at high magnification/resolution. In response to a selection of an area of the navigation map, the claimed method transfers the high magnification/resolution image data, for the selected area, to the terminal, for viewing by the user.

The Examiner has rejected claims 1, 2, 4 and 5 under 35 U.S.C. § 103(a) as being unpatentable over Jansson (U.S. Patent No 4,673,988) in view of Novik (U.S. Patent No. 5,432,871).

Conventional belief, up to the time of the invention, was that a scan of the complete specimen in a single scan at high magnification/resolution was impractical (in terms of scanning time, processing requirements and memory consumption by the resulting image data). Thus in the cited references only a selected part of the specimen is scanned at high magnification/resolution.

Claims 1, 10, 19 24 and 25 have been amended in order to clarify the point that the successive images are each, individually speaking, only a part of the specimen, but the successive images together cover the complete specimen. It is believed that this feature is inherent in the claims as presented, but the clarification emphasizes that the successive images are each, individually speaking, only a part of the specimen, but the successive images together cover the complete specimen.

In order to select a part of the specimen for scanning at high magnification/resolution, for contextual appreciation it is necessary to use a single view of the entire specimen, or at least a large part of the entire specimen, typically at lower magnification. Jansson, cited by the Examiner, notes this at col 1, lines 20-23 and explains that the so called classical solution is to produce a montage of the whole specimen. However, Jansson goes on to say that it is hard to get such a high resolution image of the sample because the procedure is time consuming and tedious, and results in a final product that is either too large or has insufficient magnification (col 1, lines 23-31). Thus, the classical solution is criticized as unworkable and impractical. Also, Jansson says that it is difficult to process more than a single digitized microscope field of view at a time which creates difficulties in analysis and display of the complete specimen (col. 1 lines 38-41). Accordingly, while the reference may suggest a

method for acquiring a high resolution image, it does not take advantage of the ability to derive the navigation map from the same image, so that navigation is facilitated. In Jansson, navigation is a cumbersome process which does not employ a low resolution image of the complete specimen derived from the high resolution image.

A single scan at high magnification/resolution provides all the image data necessary for use in telemicroscopy. Further inasmuch as the high resolution image of the complete image is acquired in a single scanning step, it is possible to process the high resolution image to obtain a low resolution image which functions as the navigation map. In the cited references, the high resolution image is not the complete specimen and is not acquired in a single scan. The reference is prior art of the kind where only part of the image is sampled at high resolution.

Perhaps the limitations of language make it difficult to articulate the concept, because it is obvious that when one scans part of a sample, one is scanning an area of the sample. And that part of a sample is complete to the extent it is a defined area. However, in the prior art, the complete specimen is not acquired in a single scan. Indeed the prior art does not contemplate acquiring and assembling a high magnification/resolution image of the complete specimen in a single scan; and, except perhaps as a last resort, the prior art does not contemplate acquiring and assembling a high resolution image of the complete specimen. In other words, the prior art does not seek to acquire an image of the complete specimen at high magnification/resolution at one time, but only seeks to image some smaller portion of it in order to save scanning time and storage space. Indeed, the prior art wants to make and look at the low resolution image, and only after examining the low resolution image for areas of interest to thereafter scan and look at selected individual areas at high resolution. If a high magnification scan is made, it is only of a part of the specimen, and the parts scanned are selected from the low resolution image based on an educated guess as to what part or parts are likely to produce results.

However, the invention scans the complete specimen using a high power lens in a single scan. This too is complete to the extent it is a defined area as well. However, the difference is fundamental, in the sense that the prior art does not acquire the complete sample as is the case with the present invention. It acquires a much larger quantity of field of view

images, and thus data, and takes a longer time. In addition, it does not require manual intervention – i.e. manual selection of the area to be scanned.

The present invention seeks to do the opposite of that proposed by the prior art, namely to first scan and store the complete specimen at high resolution in one scan, and then produce a low resolution image of the entire specimen from the high resolution image so acquired. There is no guess work or risk that anything will be missed, because the entire specimen is acquired and is available at one time. Once the image of the complete specimen is acquired in a single scan at high magnification/resolution, any part of the high magnification/resolution image is immediately available for closer examination. This order is set forth in the claims inasmuch as the claim states that the high resolution image data is processed in order to obtain the low resolution image data.

In the prior art, only selected parts of the specimen are acquired at high magnification/resolution, the parts not so acquired must be acquired later and out of sequence. This takes additional time and slows down the process of examination. Indeed, interruptions due to the need to acquire, transmit and examine different parts of the specimen, reduces the spontaneity available with the present invention. These breaks in the examination process are distracting and ultimately may result in error. For example, it is possible to miss an area of a specimen, thinking that the area has already been acquired.

The Applicant notes that in the invention, the low-resolution image or “navigation map”, which is relatively small in data size, is generated from the high magnification/resolution image data. In contrast, the prior art obtains the navigation map by performing a low magnification/resolution scan of the specimen, then and in addition, the prior art performs a high resolution/resolution scan of only a selected area of the specimen. Thus, the prior art techniques utilize two separate scans, and most importantly, one of the scans is not a complete specimen. It is also useful to note that deriving the low resolution image data from the high resolution image data avoids a second scan and thereby reduces errors or artifacts that can occur as a result of multiple scans

In relation to the implementation of the invention, it is not practical to send the remote user the high-resolution image data for the complete specimen. This would be time consuming, and therefore inconvenient to the user, in view of the large quantity of data involved. Thus, the invention allows the remote user, to select, from the navigation map, an

area of interest for viewing at high magnification/resolution. Only the high magnification/resolution image data for the selected area need be transferred to the user location in response to such a selection. Thus there is no undue delay in the transfer of the images to the user. However, the remote user is free to make successive selections at any location on the navigation map. Because a high magnification/resolution image data of the complete specimen has been acquired at the outset, the user has no constraints as to the area of the specimen which can be viewed at high magnification/resolution. Thus the remote user or pathologist thus has exactly the same freedom to view the specimen as in a pathology laboratory.

In contrast, prior art techniques require the local operator to select the area of the specimen for imaging at high magnification/resolution. Then, only the part or parts of the specimen already selected and scanned at high magnification/resolution are available for examination at a remote location. This greatly restricts the ability for the remotely located user or pathologist to view areas of interest at high magnification or resolution.

Applicant submits that the prior art does not disclose or suggest imaging a complete specimen using a high power objective lens to obtain data for a high resolution, magnified image of the complete specimen. Furthermore, the prior art does not disclose or suggest digitally processing high magnification/resolution image data to obtain a low resolution copy of the composite image of the complete specimen for use as a navigation map according to the method of the invention.

Applicant believes therefore that the invention is fully distinguished over the art of record because:

- a) the complete specimen is imaged using a high power lens in a single scan to obtain high resolution image data;
- b) the high resolution image data is thereafter digitally processed to obtain the low resolution copy of the image data,
- c) the low-resolution copy of the image data is transferred to a terminal, for use as a navigation map by a user of the terminal, in order to select an area of the high resolution image for viewing at the remote location.

The cited references do not show or suggest these features alone or in combination.

In view of the foregoing, it is respectfully requested that the Examiner reconsider his rejection of the claims, the allowance of which is earnestly solicited

Respectfully submitted,

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